Runoff Risk Decision Support

Utilizing NWS Modeling and State Partnerships to Help Improve the Nation's Water Quality

WHAT IS RUNOFF RISK DECISION SUPPORT?

Runoff Risk decision support is real-time forecast guidance focused on improving nutrient application timing decisions to ensure freshly applied nutrients are not promptly transported off fields and into streams and lakes. Relying on National Weather Service (NWS) modeling, on-farm monitoring data, and multi-partner collaboration, these state led tools are a comprehensive science based approach addressing desired state and regional nutrient reduction goals. Ultimately Runoff Risk decision support will focus attention on nutrient application timing and could encourage *voluntary* behavioral change as farmers incorporate this concern into their short-term farm management planning.

WHY IS RUNOFF RISK DECISION SUPPORT NEEDED?

Many of the nation's lakes and streams suffer from water quality degradation caused by excess nitrogen and phosphorus. These nutrients eventually concentrate in coastal areas such as the Great Lakes and Gulf of Mexico, contribute to harmful algal blooms and hypoxia, and result in both economic and environmental impacts. The Gulf of Mexico Hypoxia Task Force as well as the binational Great Lakes Water Quality Agreement have called for substantial nutrient load reductions from upstream states due to the increasing severity of ecosystem impacts.

Research has shown nonpoint nutrient sources, such as agricultural runoff, are a major source of these nutrients. Further, studies have indicated a few large runoff events per year can contribute a large portion of the annual losses. As applications generally occur during the riskiest times of year for runoff (fall through early summer) it is easy to understand why there is strong demand for short-term Runoff Risk decision support tools.

Highlighting the need for this type of tool, Runoff Risk was initiated by Wisconsin legislative action in 2006 after a winter and spring with many contaminated runoff events. A state agriculture extension agent's knowledge of NWS modeling helped incorporate the NWS into a multi-partner working group that developed the first generation Runoff Risk tool in Wisconsin, the Runoff Risk Advisory Forecast (RRAF).

HOW IS RUNOFF RISK INFORMATION GENERATED?

Forecast models used by the NWS North Central River Forecast Center (NCRFC) incorporate forecast precipitation and temperatures to predict snowmelt, continuous soil moisture conditions, and runoff ten days into the future. State working groups helped correlate model responses to on-farm edge-of-field (EOF) data. This process allows runoff risk to be stratified into categories for every modeled grid cell in the state. Higher risk is indicated when large runoff events are expected to occur for two reasons: (1) there is more confidence that the models will detect the larger events and (2) EOF data has shown the largest 10% of observed events can attribute at least 60% of the annual nutrient losses. Twice every day the model output is provided to the state partners who then populate their websites and even create email and text alerts for farmers and producers in their state. Each state does require a small funding allotment to support the website and any outreach and education for related to Runoff Risk in their area. It is important to note that Runoff Risk is intended to supplement decisions and is not promoted as a regulatory tool.

Released Aug 2019
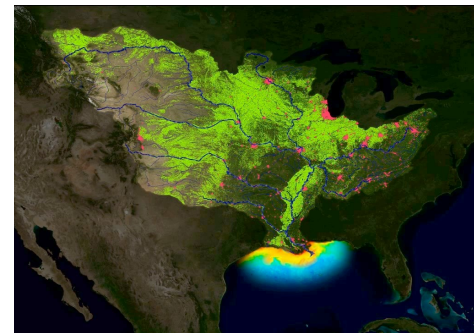
The expansion of Runoff Risk Decision Support tools across the Great Lakes region has been made possible by support from the **Great Lakes Restoration Initiative (GLRI)**
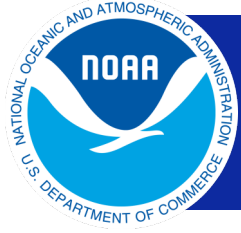
WHO CAN I CONTACT FOR MORE INFORMATION?   **NWS:** Dustin Goering (*dustin.goering@noaa.gov*)

MN: Heather Johnson (*heather.johnson@state.mn.us*)   **WI:** Ryan Erisman (*ryan.erisman@wisconsin.gov*)

**MI:** Erica Rogers (*roger392@msu.edu*)   **OH:** Matt Lane (*matthew.lane@agri.ohio.gov*)
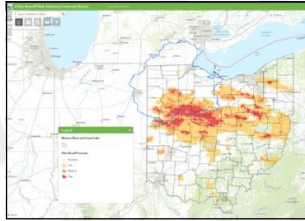
Runoff Risk Decision Support

Utilizing NWS Modeling to Help Improve the Nation's Water Quality

GREAT LAKES RESTORATION INITIATIVE SUPPORT

The NWS North Central River Forecast Center (NCRFC) partnered with the Great Lakes Restoration Initiative (GLRI) and the Environmental Protection Agency (EPA) in 2014 to expand and improve the Runoff Risk tools across the Great Lakes region. Runoff Risk tools are currently available in MN, MI, WI, and OH. Expansion into IN, IL, and NY is possible if potential state partners are interested.
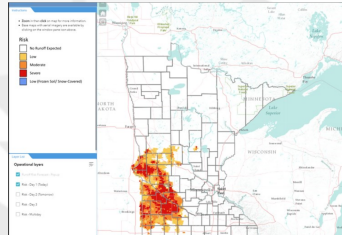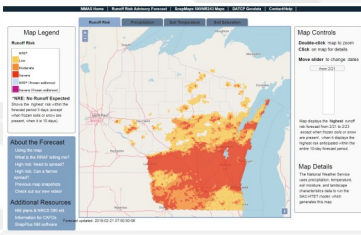
FUTURE IMPROVEMENTS

The demand for Runoff Risk decision support guidance is expected to grow with increasing tool awareness and increasing attention towards nutrient pollution impacts in the Great Lakes and the Gulf of Mexico. The NWS and state partners are planning for continual Runoff Risk improvements in the future. Starting in 2019, GLRI is supporting the development of a third version of Runoff Risk based on the new NOAA National Weather Service National Water Model (NWM) framework which will allow finer resolution modeling and open up Runoff Risk to interested states across the continental U.S.

MULTI-PARTNER COLLABORATION IS ESSENTIAL

Runoff Risk decision support tools are a unique example of collaboration between state working groups, federal and state agencies, universities, and the agricultural industry to develop real-time tools providing farmers and producers guidance which could help states meet nutrient reduction goals. The Great Lakes Restoration Initiative has been instrumental in the advancement and expansion of Runoff Risk decision support. NOAA Sea Grant and NOAA Regional Collaboration Teams have provided support in facilitating regional networks, expertise, communication, and outreach in support of this effort. Additionally, the NOAA Central Region Team supported the production of a full length video and short trailer to educate on hypoxia, HABs, and Runoff Risk Decision Support (youTube: search for "Runoff Risk").

To visit the Runoff Risk webpages for Michigan, Minnesota, Ohio, and Wisconsin, use the regional quick link:

RunoffRisk.info